3

Commission-determined methodology, we must prescribe certain criteria to ensure consistency in calculations of federal universal service support. Consistent with the eight criteria set out in the Joint Board recommendation,[653] we agree that all methodologies used to calculate the forward-looking economic cost of providing universal service in rural, insular, and high cost areas must meet the following criteria:

(1) The technology assumed in the cost study or model must be the least-cost, most-efficient, and reasonable technology for providing the supported services that is currently being deployed A model, however, must include the ILECs' wire centers as the center of the loop network and the outside plant should terminate at ILECs' current wire centers. The loop design incorporated into a forward-looking economic cost study or model should not impede the provision of advanced services. For example, loading coils should not be used because they impede the provision of advanced services.[654] We note that the use of loading coils is inconsistent with the Rural Utilities Services guidelines for network deployment by its borrowers.[655] Wire center line counts should equal actual ILEC wire center line counts, and the study's or model's average loop length should reflect the incumbent carrier's actual average loop length.

(2) Any network function or element, such as loop, switching, transport, or signaling, necessary to produce supported services must have an associated cost.

(3) Only long-run forward-looking economic cost may be included. The long-run period used must be a period long enough that all costs may be treated as variable and avoidable. The costs must not be the embedded cost of the facilities, functions, or elements. The study or model, however, must be based upon an examination of the current cost of purchasing facilities and equipment, such as switches and digital loop carriers (rather than list prices).

(4) The rate of return must be either the authorized federal rate of return on interstate services, currently 11.25 percent, or the state's prescribed rate of return for intrastate services. We conclude that the current federal rate of return is a reasonable rate of return by which to determine forward looking

[653] The state members of the Joint Board also evaluated the models based on whether they meet the criteria set out in the Joint Board recommendation. *See* Majority State Members' Second State High Cost Report at 2-6.

[654] *See* Majority State Members' Second High Cost Report at 7.

[655] RUS model reply comments at 4.

12.1.3 Distribution Network Design

To help achieve acceptable transmission in the distribution network, design rules are used to control loop transmission performance. Loops are designed on a global basis to guarantee that loop transmission loss is statistically distributed and that no single loop in the distribution network exceeds the signaling range of the central office.

Prior to 1980, loops were usually designed using one of the following design plans: Resistance Design (RD), Long-Route Design (LRD), or Unigauge Design (UG). The most common current design plans applied only on a forward-going basis (retroactive redesign is not generally deployed) are the following: Revised Resistance Design (RRD), Modified Long-Route Design (MLRD), and Concentrated Range Extender with Gain (CREG).[1]

RRD guidelines recommend that loops 18 kft in length or less, including bridged-tap[2], should be nonloaded and have loop resistances of 1300 Ω or less; loops 18 kft to 24 kft in length (including bridged-tap) should be loaded and have loop resistances less than or equal to 1500 Ω; loops longer than 24 kft should be implemented using Digital Loop Carrier (DLC) as first choice, or by CREG or MLRD as second choices.

RRD limits bridged-tap to less than 6 kft for nonloaded cable. For loaded cable, the end section plus bridged-tap must be greater than 3 kft but less than 12 kft.

MLRD applies to the design of loops having loop resistances greater than 1500 Ω but less than or equal to 2800 Ω. All cables should be loaded, and MLRD recommends that two cable gauges be used along with the required range extension and gain. The bridged-tap and end-section requirements are compatible with RRD for loaded cable.

The CREG plan allows for increased use of finer gauge cable facilities by providing a repeater behind a stage of switching concentration in the central office. In this way, the range-extension circuitry is shared rather than dedicated in each loop. CREG design applies to loops having loop resistances of 0 to 2800 Ω. Its loading, bridged-tap, and end-section requirements are compatible with RRD and MLRD, unlike the UG plan that it replaces.

Current design plans offer improved transmission performance over the old plans, while all plans provide approximately the same minimum loop transmission loudness ratings.

1. See Section 7, "Transmission", for additional information regarding the design rules for these plans.
2. A bridged-tap is any branch or extension of a cable pair beyond the point where it is used and in which no direct current flows when a station set is connected to the pair in use.

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12.1.4 Carrier Serving Areas

The evolution of the network that can provide digital services using distribution plant facilities has led to the development of the CSA concept. A CSA is a geographical area that is, or could be served by, a DLC from a single remote terminal site and within which all loops, without any conditioning or design, are capable of providing conventional voice-grade message service, digital data service up to 64 kbps, and some 2-wire, locally switched voice-grade special services (see Figure 12-2). The maximum loop length in a CSA is 12 kft for 19-, 22-, or 24-gauge cables and 9 kft for 26-gauge cables. These lengths include any bridged-tap that may be present. The maximum allowable bridged-tap is 2.5 kft, with no single bridged-tap longer than 2.0 kft. All CSA loops must be unloaded and should not consist of more than two gauges of cable.

The area around the serving central office within a distance of 9 kft for 26-gauge cable and 12 kft for 19-, 22-, and 24-gauge cables, although not a CSA, is compatible with the CSA concept in terms of achievable transmission performance and supported services.

In addition to the CSA concept, the LECs also use the Serving Area Concept described above.

12.2 Metallic Loop Conditioning

The transport of digital signals carrying 56 kbps or more bandwidth may require additional design considerations. Restrictions on loss and bridged-tap, removal of build-out capacitors, introduction of echo cancelers and line equalizers, and coordination with other services in the same cable may be required.

New digital signal-processing techniques, such as those used in the Integrated Services Digital Network (ISDN) Basic Rate Access (BRA) Digital Subscriber Line (DSL), permit the deployment of 160 kbps signals on most nonloaded loops ($\leq 1300\ \Omega$) without any conditioning.

Copper cables are the most widely deployed transmission media today. However, fiber-optic cables are usually the media of choice in the feeder plant for deployment of DLC. Fiber cables in the distribution plant may also be needed to handle the increasing bandwidth required for future services (Section 12.12). Radio transport is also used in selected routes.

Table 7-11. Loop Design Plans

<table>
<tr><th>Design Parameter</th><th>Carrier Serving Area</th><th>Revised Resistance Design</th><th>Modified Long-Route Design</th></tr>
<tr><td>Loop Resistance (Ω)[a]</td><td>N/A (limited by loss)</td><td>0-18 kft: 1300 max.
18-24 kft: 1500 max.</td><td>1501-2800</td></tr>
<tr><td>Loading</td><td>None[b]</td><td>Full H88 > 18 kft</td><td>Full H88</td></tr>
<tr><td>Cable Gauging</td><td>Two gauges, except stubs and fuse cables (max. lengths including BT):
• 24-, 22-, and/or 19-gauge: 12 kft
• 26-gauge: 9 kft[c]</td><td colspan="2">Two-gauge combinations (22-, 24-, 26-gauge) preferred</td></tr>
<tr><td rowspan="2">Bridged Tap (BT) and End Section (ES)</td><td rowspan="2">Total BT 2.5 kft max.
No single BT > 2 kft</td><td>Nonloaded cable & BT: 18 kft max. Total BT: 6 kft max.</td><td>ES & BT: 3 to 12 kft</td></tr>
<tr><td colspan="2">Loaded: ES & BT, 3 to 12 kft</td></tr>
<tr><td>Transmission Limitations</td><td>None; supports ISDN DSL, 56-kb data, and "despecialized" special services</td><td>Compatible with ISDN DSL. No digital services > 18 kft.</td><td>No digital services. Needs range extender with gain if > 1500 Ω.</td></tr>
</table>

a. Includes (only) the resistances of the cable and loading coils.

b. At least one exchange carrier uses an "extended Carrier Serving Area (CSA)" in some rural areas. This variant allows loading but does not accommodate digital services.

c. Multigauge designs incorporating 26 gauge are restricted in total length to 12 - [$3L_{26}/9$-BT] kft, where L_{26} is the total length of the 26-gauge and BT is the sum of bridged taps of all gauges.

7.15.4 Performance of RRD and MLRD Loops

The RRD and MLRD plans employ similar loading schemes, have the same end-section and bridged-tap rules, and are compatible with any combination of cable gauges. These plans offer improved transmission performance over older plans and give approximately the same minimum loop ratings, that is, TOLR and ROLR (see Section 7.4.1).

Figure 7-23 shows the TOLR and ROLR for maximum-loss RRD loops as a function of loop length. The figure applies in the worst case with maximum cable resistance, bridged-tap, and end section. Dashed lines show the design limit objectives for TOLR and ROLR.

The RRD plan results in improved ratings over the resistance design plan in the 12- to 18-kft region (where maximum loss occurs) and comes closer to meeting the design limit objectives in this zone. Performance offered by the long-route design on MLRD plans differs primarily in the 1500- to 1600-Ω resistance range where the MLRD plan provides gain, resulting in better performance.

7.15.5 The Carrier Serving Area Concept

The evolution to a network that can readily provide digital services via loop facilities led to the Carrier Serving Area (CSA) concept. A CSA is an area that is or may be served by DLC. DLC may be either stand-alone (UDLC) or integrated into the end office switch (IDLC). All loops within a CSA are nonloaded. They are capable of providing on a nondesigned-basis conventional, voice-grade message service; digital data service up to 64 kbps; Digital Subscriber Lines (DSLs) for ISDN; and most locally switched, 2-wire, voice-grade special services. Ordinary channels (pair-gain pairs) on the DLC system have a loss of 2 dB or less, thus allowing for attenuation in the physical cable within the CSA. Loop length in the CSA is limited by attenuation, not by dc resistance. Bridged-tap lengths are controlled to preserve capability for high-speed, digital operation. CSA design is now used for most loop growth.

The CSA design plan is summarized in Table 7-11. The table indicates that within the CSA the maximum allowable loop length involving 26-gauge cable is dependent on the length of bridged-tap. This dependency is illustrated in Figure 7-24.

7.15.6 Digital Subscriber Line

The DSL for ISDN Basic Rate Access (BRA) transmits 160 kbps in both directions simultaneously on a nonloaded cable pair. The DSL is intended to operate with cable loss of up to 42 dB at 40 kHz. To minimize crosstalk between DSLs in the same cable binder group, the signal is recoded into 2 Binary 1 Quaternary (2B1Q) form, that is, two binary pulses become one quaternary pulse on the line (see Section 12). Almost all loops designed to resistance design criteria, whether RRD or its predecessors, will transmit a DSL signal out to 18 kft. The customer provides a Network Termination 1 (NT1) device on the customer side of the demarcation point to operate into the DSL transceiver in the central office. With suitable channel units, a DSL can be extended out to a CSA on DLC facilities.

Other emerging loop technologies are Fiber in the Loop (FITL) and High Bit-Rate Digital Subscriber Line (HDSL). These are discussed in Section 12.

12.1.4 Carrier Serving Areas

The evolution of the network that can provide digital services using distribution plant facilities has led to the development of the CSA concept. A CSA is a geographical area that is, or could be served by, a DLC from a single remote terminal site and within which all loops, without any conditioning or design, are capable of providing conventional voice-grade message service, digital data service up to 64 kbps, and some 2-wire, locally switched voice-grade special services (see Figure 12-2). The maximum loop length in a CSA is 12 kft for 19-, 22-, or 24-gauge cables and 9 kft for 26-gauge cables. These lengths include any bridged-tap that may be present. The maximum allowable bridged-tap is 2.5 kft, with no single bridged-tap longer than 2.0 kft. All CSA loops must be unloaded and should not consist of more than two gauges of cable.

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Copper cables are the most widely deployed transmission media today. However, fiber-optic cables are usually the media of choice in the feeder plant for deployment of DLC. Fiber cables in the distribution plant may also be needed to handle the increasing bandwidth required for future services (Section 12.12). Radio transport is also used in selected routes.

Section 13

DIGITAL LOOP CARRIER SYSTEMS

GENERAL

The increasing demand for an assortment of special services has made it necessary to condition the local loop network to support these services. It must be able to accommodate a wide range of transmission applications including voice, data, video, sensor control, and many others. Some of these services require high rates of transmission. Existing copper facilities can support some of the services. However, in many cases, expensive reconditioning of the cable plant will be necessary before service can be provided. The goal is to have the entire local loop network ultimately capable of supporting a transmission rate of 64 kb/sec. Nonloaded 26-gauge cable is capable of providing this bit rate within 12,000 feet (3657.6 m) of the serving central office. Digital subscriber carrier (pair gain) is necessary to meet that bit rate beyond 12,000 feet (3657.6 m).

Carrier Serving Area (CSA) Philosophy

The Carrier Serving Area (CSA) concept is to sectionalize the wire center area into discrete geographical areas beyond 12,000 feet (3657.6 m) of the central office. This sectionalization is done during the long-range outside plant planning (LROPP) process described in Section 2 of this handbook. Each CSA will ultimately be served via a remote terminal (RT) which houses the digital carrier equipment and divides the feeder from the distribution network. The boundaries of the CSA are based on resistance limits of 900 ohms for the distribution plant beyond the RT. These limits basically equate to 9,000 feet (2743.2 m) of 26-gauge cable and 12,000 feet (3657.6 m) of 19-, 22-, or 24-gauge cable including bridged tap. After the CSAs are established, when relief is required in a route and it is economical to deploy digital carrier, the RT sites can be activated. Digital carrier is also applicable to individual customer buildings or groups of buildings such as a campus environment, industrial areas, shopping centers, and condominium and apartment complexes.

CARRIER SERVING AREA (CSA) DESIGN

Copper Pair Secondary System Cables

The design and administration of the secondary system network, as previously discussed, is based on twisted pair copper cable and the associated resistance design zones as explained in Section 5 "TRANSMISSION." Demands for sophisticated services are requiring the outside plant network to support services ranging from low-bit rate transmission to high-bit rates. To meet this demand, a digital subscriber carrier is being placed into the network starting at 12,000 feet (3658 m) from the serving CO or at 9,000 feet (2743 m) if 26-gauge (0.4 mm).

The existing outside plant network beyond 12,000 feet (3658 m) may be divided into Carrier Serving Areas (CSAs). To meet the 64-kb/s transmission rate, the secondary system cables within a CSA must not exceed 9,000 feet (2743 m) in a 26-gauge (0.4 mm) design area and 12,000 feet (3658 m) in a 24/22/19-gauge (0.5/0.6/0.9 mm) area. If there is a concentration of special services in the area, these limitations may have to be reduced. The carrier equipment is housed in a Remote Terminal (RT) with an associated interface between the secondary system and primary network.

The preceding limitations are based on the secondary system cables not exceeding 900 ohms. In sparsely populated areas, secondary system cables beyond a remote terminal can be extended to 1,500 ohms by use of range extension plug-ins at the RT. The boundaries of these areas are called Expanded Carrier Serving Areas or ECSAs. However, as growth occurs in the sparsely populated areas, ECSAs should be divided into CSAs.

REQUEST NO. 139 By density zone and structure type, what other companies are assumed to be sharing the structure?

RESPONSE

Feeder Structures				
Density Zone	Aerial Pole Attachments	Buried Trenches	Underground Trenches	Underground Manholes
0-5	Power [50%] ILEC [50%]	Others [33%, 60% of the time; 0%, 40% of the time] Power [33%, 60% of the time; 50%, 40% of the time] ILEC [33%, 60% of the time: 50%, 40% of the time]	Power [50%] ILEC [50%]	ILEC [100%]
5-100	Power [50%] Others [25%, 67% of the time; 0%, 33% of the time] ILEC [25%, 67% of the time; 50%, 33% of the time]	Same as above	Same as above	Same as above
100-200	Power [50%] ILEC [25%] Composite of all others [25%]	Same as above	Others [33%, 60% of the time; 0%, 40% of the time] Power [33%, 60% of the time; 50%, 40% of the time] ILEC [33%, 60% of the time: 50%, 40% of the time]	Others [50%, 60% of the time; 0%, 40% of the time] ILEC [50%, 60% of the time: 100%, 40% of the time]
200-650	Same as above	Same as above	Power [33%] ILEC [33%] Composite of all others [33%]	ILEC [50%] Composite of all others [50%]
650-850	Same as above	Same as above	Same as above	Same as above
850-2550	Same as above	Same as above	Same as above	Same as above
2550-5000	Same as above	Same as above	Same as above	Same as above
5000-10000	Same as above	Same as above	Same as above	Same as above
10000+	Same as above	Same as above	Same as above	Same as above

Note: Composite of all others includes CATV (perhaps multiple CATV companies), CLECs (perhaps multiple CLECs), Long Distance Carriers (perhaps multiple Long Distance Carriers), Municipal Requirements such as alarm and streetlight circuits, Private Communications facilities, Gas (in trenches only), etc.

Distribution Structures				
Density Zone	Aerial Pole Attachments	Buried Trenches	Underground Trenches	Underground Manholes
0-5	Power [50%] ILEC [50%]	Power [33%] ILEC [33%] Composite of all others [33%]	ILEC [100%]	ILEC [100%]
5-100	Power [50%] Others [25%, 67% of the time; 0%, 33% of the time] ILEC [25%, 67% of the time; 50%, 33% of the time]	Same as above	Power [50%] ILEC [50%]	Same as above
100-200	Power [50%] ILEC [25%] Composite of all others [25%]	Same as above	Same as above	Same as above
200-650	Same as above	Same as above	Same as above	Same as above
650-850	Same as above	Same as above	Others [33%, 60% of the time; 0%, 40% of the time] Power [33%, 60% of the time; 50%, 40% of the time] ILEC [33%, 60% of the time: 50%, 40% of the time]	Others [50%, 60% of the time; 0%, 40% of the time] ILEC [50%, 60% of the time: 100%, 40% of the time]
850-2550	Same as above	Same as above	Power [33%] ILEC [33%] Composite of all others [33%]	ILEC [50%] Composite of all others [50%]
2550-5000	Same as above	Same as above	Same as above	Same as above
5000-10000	Same as above	Same as above	Same as above	Same as above
10000+	Same as above	Same as above	Same as above	Same as above

Note: Composite of all others includes CATV (perhaps multiple CATV companies), CLECs (perhaps multiple CLECs), Long Distance Carriers (perhaps multiple Long Distance Carriers), Municipal Requirements such as alarm and streetlight circuits, Private Communications facilities, Gas (in trenches only), etc.

condominium arrangements, or through other arrangements such as one where the telephone company and power company each own every other pole. Cable companies have commonly leased a portion of the pole space available for low voltage applications from either the telephone company or the power company. Methods of setting purchase prices and of calculating pole attachment rates generally are prescribed by federal and state regulatory authorities.

The number of parties wishing to participate in pole sharing arrangements should only increase with the advent of competition in local telecommunications markets. Economic and institutional factors strongly support reliance on pole sharing arrangements. It makes economic sense for power companies, cable companies and telephone companies to share pole space because they are all serving the same customer. Moreover, most local authorities restrict sharply the number of poles that can be placed on any particular right-of-way, thus rendering pole space a scarce resource. The Federal Telecommunications Act reinforces and regulates the market for pole space by prescribing nondiscriminatory access to poles (as well as to conduit and other rights-of-way) for any service provider that seeks access. The aerial distribution share factors displayed below capture a forward-looking view of the importance of these arrangements in an increasingly competitive local market.

B.2. Structure Sharing Parameters

The Hatfield Model captures the effects of structure sharing arrangements through the use of user-adjustable structure sharing parameters. These define the fraction of total required investment that will be borne by the LEC for distribution and feeder poles, and for trenching used as structure to support buried and underground telephone cables. Since best forward looking practice indicates that structure will be shared among LECs, IXCs, CAPs, cable companies, and other utilities, default structure sharing parameters are assumed to be less than one. Incumbent telephone companies, then, should be expected to bear only a portion of the forward-looking costs of placing structure, with the remainder to be assumed by other users of this structure.

The default LEC structure share percentages displayed below reflect most likely, technically feasible structure sharing arrangements. For both distribution and feeder facilities, structure share percentages vary by facility type to reflect differences in the degree to which structure associated with aerial, buried or underground facilities can reasonably be shared. Structure share parameters for aerial and underground facilities also vary by density zone to reflect the presence of more extensive sharing opportunities in urban and suburban areas. In addition, LEC shares of buried feeder structure are larger than buried distribution structure shares because a LEC's ability to share buried feeder structure with power companies is less over the relatively longer routes that differentiate feeder runs from distribution runs. This is because power companies generally do not share trenches with telephone facilities over distances exceeding 2500 ft.[58]

[58] A LEC's sharing of trenches with power companies, using random separation between cables for distances greater than 2,500 feet requires that either the telecommunications cable have no metallic components (i.e., fiber cable), or that both companies follow "Multi-Grounded Neutral" practices (use the same connection to earth ground at least every 2,500 feet).

Florida - Total Plant Mix - Copper and Fiber

Density Group	Aerial Percent	Underground Percent	Buried Percent	Total Percent
0 - 5	5.0%	12.5%	82.6%	100%
6 - 100	5.2%	13.5%	81.3%	100%
101-200	5.5%	14.5%	80.1%	100%
201 - 650	5.7%	15.4%	78.9%	100%
651 - 850	5.9%	16.4%	77.7%	100%
851 - 2550	6.1%	17.3%	76.6%	100%
2551 - 5000	6.4%	18.2%	75.5%	100%
5001 - 10000	6.6%	19.0%	74.4%	100%
> 10001	6.8%	19.9%	73.4%	100%
Total	5.9%	16.4%	77.7%	100%

Florida Power Corp

	DIST		+ TRANS
Aerial	17,624	74%	27,224
Buried	6,290	26%	6290
			33,514

Transmission 4,600 Aerial
Ø Buried

14

Florida Power

Distribution Lines
Aerial - 17,624 miles > 74%
Buried - 6290 miles > 26%

Transmission Lines - 4,600 miles
4 rural areas (100%)

1-800-700-8744
(ext. 5273)
(Mrs. Lotz)
- (Customer Service)

condominium arrangements, or through other arrangements such as one where the telephone company and power company each own every other pole. Cable companies have commonly leased a portion of the pole space available for low voltage applications from either the telephone company or the power company. Methods of setting purchase prices and of calculating pole attachment rates generally are prescribed by federal and state regulatory authorities.

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[58] A LEC's sharing of trenches with power companies, using random separation between cables for distances greater than 2,500 feet requires that either the telecommunications cable have no metallic components (i.e., fiber cable), or that both companies follow "Multi-Grounded Neutral" practices (use the same connection to earth ground at least every 2,500 feet).

Distribution Cables—Fiber In The Loop (FITL)

The size of the distribution cable is based on the number of MSDTs rather than on pairs per customer as with copper facilities. In some situations it may be economical to place paralleling single-fiber cables in the same trench to each MSDT rather than place a multifiber cable and introduce numerous branch splices into the network. A more detailed explanation and illustrations showing FITL with the AT&T *SLC*-2000 MSDT is located in Section 13, "DIGITAL LOOP CARRIER SYSTEMS."

Feeder Cables—Copper

Urban and Suburban Areas

Buried feeder cables in urban areas should be sized for an economical period. Caution must be taken when determining the location of a buried feeder cable so that it will not interfere with the placing of future feeder cables or underground conduit.

Low-Density (Rural) Areas

Feeder pairs and distribution pairs in rural areas are generally contained in the same cable. Therefore sizing of feeder cables in rural areas should include the pairs required in each distribution section.

JOINT CONSTRUCTION

AT&T 629-020-100

In areas where both power and telephone utilities plan to bury their facilities, a joint trench is usually advantageous. Besides saving in installation cost, there is less likelihood of damage during construction. Successful joint operations require advance planning and close coordination with the utilities involved. **Joint trenching with power facilities should be employed only for distribution cables and service wires, not for feeder or trunk cables.**

trenching. Particularly in new subdivisions it's a very common practice these days.

Q. Did you understand my question, Mr. Wells?

A. You asked -- the question as I recall was did they go out and do survey data before they arrived at the value. My answer was no they arrived at the value based on their experience and subsequent to that we have undertaken validation to show that it was a good value.

Q. And in that validation process have you actually found a LEC anywhere either incumbent or alternative LEC that has achieved a 33 percent sharing factor?

A. Well --

Q. (Interposing) I'm sorry, could I have a yes or no please before you explain.

A. I'm sorry.

Q. I'll ask the question again. As part of your validation process have you found either an alternative LEC, or competitive LEC, or an incumbent LEC that has achieved a 33 percent sharing factor anywhere in North America?

A. The answer is no and that's not the relevant criteria because the model is suppose to be least cost, most efficient forward-looking. So you have -- the relevant criteria is what a competitive local exchange

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the electric company will pay for a third of the cost?

A. The assumption is that -- no, that is not the total correct characterization. The correct characterization at some point in the future that that there will be other utilities that will be more than willing to share the cost, or you will have situations where developers will open trenches and incur all the costs. So the only cost that the LEC would incur or the ILEC, I'm sorry, the CLEC would incur would be to lay the cable in the trench. So we see that as a scenario, we see municipalities requiring joint trenching so that the streets don't get cut up anymore than they have to be, and we see, once again, the incentives for utilities in competitive environments and the number of utilities that will be out there creating these opportunities.

Q. So these are opportunities that you believe will be created in the future?

A. Yes, that is correct.

Q. And to loop back to my original question today the electric company is not going to pick up part of the cost of the support structures for the distributuion cable because they already have plant to serve their customers, right?

A. The answer to that question would be yes --

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Mr. Wells

Q. (Interposing) Now --
A. -- but that's reflective of the embedded network that there's today --
Q. (Interposing) Now, by the same token, if you went to the cable company that serves a particular area in North Carolina and you said well we want you to pick up a third of the cost of our support structures. The same thing, today, they wouldn't do that to the extent that they have plant to serve their current customers, correct?
A. As you've phrased the question the answer to that is correct, but that's not the correct characterization. You don't go and say will you pick up this. What will happen in the future is --
Q. (Interposing) Well, I'm sorry, I don't want to interrupt you but we're not talking about the future we're talking about today.

MR. MOOD: It appears to me, Madam Chairman, that Mr. Wells is trying very hard to give yes and no answers in compliance with the front form of the questions asked by Mr. Carver, but at the same time he's got to be permitted an opportunity to fully respond and not be interrupted as he's making his explanations.

COMMISSIONER DUNCAN: All right. I'll ask both parties to try harder. Mr. Wells to respond directly and concisely to the question and Mr. Carver to let him finish.

MR. CARVER: Yes, ma'am, I'll try not to interrupt him. I think part of the problem is I've asked him several questions about current conditions and in each instance in his answer he starts talking about the future so I don't believe the witness is being responsive. And I apologize for cutting him off but I would like for him to answer the questions I'm asking.

COMMISSIONER DUNCAN: All right. If you delimit the question as being in the present, Mr. Wells, if you can respond accordingly -- excuse me, if you feel for completeness that you do need to caveat then can you do so very briefly?

A. Yes, ma'am. Thank you.

COMMISSIONER DUNCAN: Thank you.

Q. (MR. CARVER) Okay. Mr. Wells, we're talking again about today, we're not about what you think may happen in the future. Today to the extent that a particular cable company has plant in place to serve customers they are not going to be willing to pick up a third of the cost of the support structures of the incumbent LEC, isn't that true?

<u>Structure Percent Assigned to Telephone Company (NVHIP 5.4)</u>

REQUEST NO. 136 **Provide copies of all questionnaires, and respective responses, sent to telecommunications companies, CATV providers, utilities, and any other party used in calculating the default input values for aerial feeder and distribution structure percent assigned to the telephone company.**

RESPONSE

The HAI Model default input values for aerial feeder and distribution structure percent assigned to the telephone company are based on the expert opinion of a team of engineers with extensive experience. Questionnaires were not sent to vendors, contractors, nor any other party to determine the default input values for aerial feeder and distribution structure percent assigned to the telephone company.

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REQUEST NO. 145 **Provide copies of any structure sharing contracts that were reviewed in conjunction with the development of this input value.**

RESPONSE

A specific contract or contracts were not explicitly sourced in deriving the structure sharing default values in the HAI Model. Members of the engineering team supporting the HAI Model are familiar with such contracts. Some, such as Messrs. Donovan, Riolo, and Fassett have considerable experience with such contracts. Some structure sharing contracts have been provided in proceedings, but have been reviewed by an individual member or members of the engineering team under protective order.

References

Industry experience and expertise of HAI

The knowledge of AT&T and MCI outside plant engineers.

Outside Plant Consultants

Montgomery County, MD Subdivision Regulations

Policy Relating to Grants of Location for New Conduit Network for the Provision of Commercial Telecommunications Services

Monthly Financial Statements of the Southern California Joint Pole Committee.

Conversations with representatives of local utility companies.

New York Telephone's Response to Interrogatory of January 22, 1997, Case 95-C-0341: Pole Attachments, State of New York Public Service Commission, January 27, 1997.

Direct Panel Testimony of Richard Wolf, Clay T. Whitehead, Donald Fiscella, David Peacock and Dr. Miles Bidwell on Behalf of the Electric Utilities, Case 95-C-0341: Pole Attachments, State of New York Public Service Commission, January 27, 1997.

"Statement of Joint Pole Units and Annual Pole Unit Changes by Regular Members", Monthly Financial Statements of the Southern California Joint Pole Committee, October 1996.

REQUEST NO. 146 **Provide the actual percentage of the Empire City Subway conduits which are occupied by telecommunications providers other than the ILEC, as referenced in Appendix B of the inputs portfolio, pages 148-149.**

RESPONSE

The question, as phrased, would be inexact enough to answer in that it does not specify whether any trench foot containing non-ILEC telecommunications providers should be divided by the total trench feet of conduit owned by Empire City Subway, or whether the total conduit duct feet occupied by non-ILEC telecommunications providers should be divided by the total duct feet owned by Empire City Subway, with or without spare duct feet counted. Notwithstanding those reservations, that information would undoubtedly be considered proprietary by Bell Atlantic, and is not available to AT&T and its consultants.

Re: Structure Sharing

discussion and then concurrence.
Q. But you weren't actually a party in this instance, correct?
A. That is correct. That value existed in 2.2.2 before I became a member of the team. (Wells)
Q. Who proposed it?
A. I was not there.
Q. So you don't have firsthand knowledge of who proposed it or by whom it was discussed or how that process went?
A. All that took place before I became a member of the team.
Q. Okay. So what you just told me about the process is basically you're assumption based on the way it is generally done, correct?
A. Yes.
Q. Do you know as a part of this process if they went out and actually surveyed any actual incumbent LECs to see if they were achieving the sharing percentage?
A. As part of the process they would have offered their collective experience to develop the value. Subsequent to that, we have as part of our witnessing role going out across the country, we have various photographs and so forth that would show joint

discussion and then concurrence.

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A. As part of the process they would have offered their collective experience to develop the value. Subsequent to that, we have as part of our witnessing role going out across the country, we have various photographs and so forth that would show joint this particular input, did you?

A. I think in meetings, I'm sorry, the answer is yes. Okay. But let me describe what I mean by yes. When the team gets together, and as I said, one of the members of the team who are more expert in that area is going to propose something they may have documentation that would justify why their proposal is a good one and they share that documenation in that particular meeting and it helps us come to the consensus that we need to sponsor that particular position. So in that sense there would be.

Q. Well, in this particular instance the input was developed before you arrived and I think you said that you don't know whether they developed any documentation so my question is did you specifically review anything that was provided to you by them before you arrived at the conclusion that you could support this input?

A. The answer is no and I presume we're talking about the buried structure sharing --

Q. (Interposing) Yes, we're still talking about sharing.

A. The answer is no.

Q. Okay. Thank you. Now, let me ask you about the Hatfield Model generally. In general, do you believe

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this particular input, did you?

A. I think in meetings, I'm sorry, the answer is yes. Okay. But let me describe what I mean by yes. When the team gets together, and as I said, one of the members of the team who are more expert in that area is going to propose something they may have documentation that would justify why their proposal is a good one and they share that documenation in that particular meeting and it helps us come to the consensus that we need to sponsor that particular position. So in that sense there would be.

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Q. (Interposing) Yes, we're still talking about sharing.

A. The answer is no.

Q. Okay. Thank you. Now, let me ask you about the Hatfield Model generally. In general, do you believe